

# The Effects of Mouth Bacterial Infection on Saliva Flow

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## Abstract

**Background:** Mouth bacterial infections most probably due to dental cares are a prevalent disease. Salivary flow rate is affected by many diseases but there is not enough published data about the effect of mouth bacterial infection on the salivary flow rate. **Objective:** this study examines the relationship between salivary flow rate and mouth bacterial infection in adult population. **Methodology:** cross sectional study. **Result:** salivary flow rate is affected by mouth bacterial infection as it is founded to be very low flow rate in 17% and low flow rate in 40% of the sample population. **Conclusion** Salivary flow rate is affected by oral bacterial infections that need urgent medical intervention to improve the outcome of those patients.

**Keywords:** Mouth; bacterial infection; health care; toxicity

## Introduction

Oral infections are defined as a problem for patients suffering from chronic conditions as cancer and infection with human immunodeficiency virus and patients with ventilator associated pneumonia. There are intrinsic bacteria in the mouth that are associated with two major oral diseases, caries and periodontal diseases <sup>(10)</sup>.

In a survey done in the United States from 2011 to 2014, there is about one in each four adults aged from 20 to 64 years and one in each six adults aged 65 years or older had untreated mouth cares. the prevalence of periodontitis in the United States which is reported in the National Health and Nutrition Examination Survey from 2009 to 2014, was 42% among adults 30 years or older <sup>(5)</sup>.

The oral cavity containing most types of vast flora in the all human body and is the main entrance port for two major systems which considered vital to human function and physiology, the gastrointestinal system and respiratory system. Also a specific pathologic condition in the oral cavity such as periodontitis which is an inflammation of the periodontal attachment of the teeth and the alveolar bone can be present in the oral cavity. Infection organisms which arise from peridonditis can affect many body systems and salivary gland secretion also <sup>(21)</sup>.

Oral bacterial infection can also be associated with many effects in body systems. It also can affect salivary flow by many mechanisms. Salivary flow reduction is a condition that affects oral health. Its prevalence is not published in adults and there is no known treatment for increasing the salivary flow rate. Reduced salivary flow is related to dental caries and mouth bacterial infections which are considered the most common oral disease. Salivary flow rate is reduced in people with inadequate food intake and subsequent insufficient nutrition carried to the salivary glands <sup>(6)</sup>.

The prevalence of low salivary flow rate was ranging from 10.9 to 17.8% and 17.3 to 22.7%, respectively and the reduced salivary flow rate in adults was related to caries and oral infections <sup>(6)</sup>.

There is lack in the published data about effect of mouth bacterial infection on saliva flow. So this study tries to address this issue.

## Aim of the Work

To improve the medical care service provided to patients suffering from oral bacterial infections.

## Objectives of the Study

This study will examine the relationship between salivary flow rate and oral bacterial infection in adult

population.

### Research Question

Does mouth bacterial infection can affect the stimulated salivary flow rate?

#### HYPOTHESIS

##### Null hypothesis

Bacterial mouth infections has no effect on salivary flow rate

##### Alternative hypothesis

Bacterial mouth infections associated with reduced salivary flow rate

#### Research Design and Methods

##### Study Design:

Cross sectional study will be conducted from November 2019 to January 2020

##### Study Setting:

The study will be conducted at the outpatient of private clinics at Al-Hilla City.

##### Target population:

The target population will be adult patients who suffering from bacterial mouth infections at Al-Hilla City.

##### Inclusion Criteria:

Adults aged from 18 to 65

Adults Suffering from bacterial mouth infections

##### Exclusion Criteria:

Patients who refuse to participate in the study.

Patients suffered from debilitating disease which can affect saliva as diabetes mellitus.

##### Sampling

**Frame:** patients with bacterial mouth infections who fulfilled the inclusion criteria will be enrolled in this study.

**Method:** systematic random sampling

**Sample Size:** The sample size was calculated and about 100 patients.

#### Data Collection Tools

Data about socioeconomic characteristics and medical history will be fulfilled. Oral examinations will be done.

Saliva samples un-stimulated will be collected at 7 AM and 12 PM and salivary flow rate, pH, and viscosity will be assessed.

Salivary flow will be categorized to:

Very low salivary flow rate was below 0.1 mL/min

Low 0.1-0.2 mL/min

Normal > 0.2 mL/min

#### Data Management:

The data was collected, coded and entered into the computer via Excel 2018 program. SPSS program version (21) will used for data analysis. Data will analyze and presented as numbers and percentages using tables and graphs with the CI at 95%. P value <0.05 were used as the limit of statistical significance.

#### Ethical Considerations:

· Approval of the responsible authorities was obtained from Al-Mustaqbal University College.

· Participant was informed with the aim of the study and its benefit to them as it could help in improving the medical care provided to patients with oral bacterial infections.

· Written informed consent was obtained from the participant.

· Ensure the confidentiality of data collected, and that no data were going to be used outside this study without personal approval.

· The researcher's phone number was provided to the participant for any enquiries.

· The participant had the right to withdraw from the research at any time or even refuse to participate

from the beginning with no effect on the decisions taken for the plan of the management.

**Budget**

**Table 1: The budget of the study was offered by the researcher.**

Item	Estimated Costs
Data Collection	2000 D.
Data Management	500 D.
Preparation of final book and presentation	500 D.
Others (Transportation, Printing, Internet access ... etc.)	200 D.
Total	3200 D.

**Time Table**

**Table 2: Time needed for preparation of the thesis:**

Duration/weeks	1-3	4-6	7-8	9-10	11	12
Protocol Preparation						
Literature review						
Data collection						
Data analysis						
Editing						

**Statistical Analyses**

Statistical analysis was done by using SPSS version 20 in which, mean and standard deviation were used as descriptive statistics and analysis of variance with LSD for comparison between groups. P value ≤ 0.05 regarded significant.

**Results**

According to socio-demographic characteristics, it is founded that the number of males were 30 and the

females were 70 with the median age of 45 years, the age ranged from 18 to 65 years. 60% of the sample population was from urban areas and 40% were from rural areas. From the studied 100 patients with mouth bacterial infections, about 17% of them had very low salivary flow rate and 40 % had low salivary flow rate and the remaining 43% had normal salivary flow rate. Multiple logistic regression analysis revealed that very low salivary flow was common in females, obese, above 45 ages and with low socioeconomic status.

**Table.3. basic characteristics of all patients**

Baseline characteristics	N/value	N/ Value
Female	30	
Male	70	
Urban	60	
Rural	40	
Age (years, median)		45

**Table.4. Classification of salivary flow rate**

Salivary flow rate	N
Very low salivary flow rate	17
Low salivary flow rate	40
Normal salivary flow rate	43

### Discussion

This study revealed that about 17% of patients with mouth bacterial infections had very low salivary flow rate and 40 % had low salivary flow rate and the remaining 43% had normal salivary flow rate which is inconsistent with <sup>(6)</sup> .who founded that the prevalence of salivary flow rate in dental cares patients was very low and low in 17.8% and 17.3 respectively. This may be due to low prevalence of mouth bacterial infection in Flink sample population <sup>(14)</sup>.

This study is inconsistent with <sup>(19)</sup> .who mentioned that there were no significant differences in saliva flow rate between dental caries and infection calculus and non-calculus groups but it is consistent with <sup>(22)</sup> who found low saliva in cares.

This study revealed that salivary flow rate is more in females who is obese which is consistent with the study of <sup>(16)</sup> who found that The obese patients exhibited higher number lower salivary flow rate of the stimulated whole saliva ( $P < 0.001$ ) which may prove the effect of obesity on oral health <sup>(13)</sup>.

It is founded that patients with poor oral hygiene were about more than eight times more likely to suffer from obesity than patients with good oral hygiene which may be related to bacterial inflammatory cytokines in the

infected saliva which may be related to disturbances in the metabolism as discussed by <sup>(15,18)</sup>.

This study revealed that low salivary flow rate is mostly in low socioeconomic females with malnutrition which is inconsistent with <sup>(21)</sup> and <sup>(20)</sup> who found that there is no correlation between salivary flow rate and nutritional status <sup>(2)</sup>.founded that there is a relation between salivary flow and socioeconomic status.

### Conclusion

Mouth bacterial infection is a prevalent disease and has a negative effect on bacterial flow rate as it decreases the flow rate and this flow rate reduction is associated with low socioeconomic status and obesity

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq

**Conflict of Interest:** None

**Funding:** Self-funding

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